The DOE Fuel-Cell AR&TD Program

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Role of DOE Fuel-Cell AR&TD

- To Support Major Fuel Cell Developers
  - New Materials
  - New Manufacturing Processes
- To Identify Breakthroughs That Lead to New Technologies
- To Verify R&D Claims
- To Maintain a Broad U.S. Technology Support Base
  - Equipment
  - Personnel

AR&TD Issues

- Declining R&D Funding by Government and Industry
- Shrinkage of Number of Universities Conducting Research in Some Fuel Cell Areas in Some Countries
- Lack of Forums for Communicating Results to Industry
- Short Time Horizon for Research Results
- Lack of Fuel-Cell Research Associations in Some Countries

Some AR&TD Funding Mechanisms

- Direct Contract to a Funding Agency
- University Coal Research
- Subcontract to DOE Developer
- SBIRs
- Consortia

Fuel Cell R&D Areas for Consortia, Pre-Commercial R&D

- Advanced New Manufacturing Processes That Reduce Environmental and Cost Problems
- Advanced Materials That Promise Better Properties and Performance

Solid Oxide Fuel Cells: Developmental Issues

- Lower Cost Materials and Manufacturing Processes
- Sealing in Planar Designs
- Gas Pre-Heating
- Material Corrosion: Changes in Composition, Porosity, Density, Phase, etc., Over Time
- More Compatible Materials for Interconnect, etc.
- Lower Temperature Materials
- Thinner Components
- Thermal Cycling

Carbonate Fuel Cells: Technical Issues

- Life and Endurance Testing
- Thermal Cycling
- Lower Cost Aluminization
- Higher Power Density
- Improved Stability: Corrosion and Electrolyte Loss
- Develop Environmentally Friendly, Low-Cost Compositions/Fabrication Processes

FY 1997 Agency Funding

($ millions)

	PEM	SOFC	MCFC	PAFC
DOE, FE	--	13.0	37.0	--
DOE, EE	21.0	--	--	--
DOD, ES	--	--	--	8.0
DARPA	3.0	1.0	2.0	--
GRI	--	1.0	--	--
EPRI	--	1.0	--	--
DOT	2.5	--	--	2.5
Total	**26.5**	**16.0**	**39.0**	**10.5**